INORGANIC CHEMICAL ANALYSES OF GROUND - WATER SAMPLES

Table 1. Inorganic Chemical Analyses - Shallow Overburden Wells

(sample locations shown on Map 3126–1)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
8025	24/06/80	7.6	0.11	90	17	4	1.7	248	18	7	0.1	5.3	248	297	360	535
57102	23/06/80	7.7	.06	75	5	4	5.9	183	23	2	<0.1	1.8	183	208	255	394
57106	23/06/80	7.4	.19	120	17	5	4.3	192	36	84	<0.1	58	192	369	590	720
57108	23/06/80	7.6	.09	65	3	2	1.4	77	19	2	<0.1	22	77	176	235	365
57109	23/06/80	7.4	.24	133	12	19	7.6	291	41	28	0.1	13	291	382	545	762
57113	23/06/80	7.5	.27	75	2	2	0.8	167	16	7	<0.1	<0.1	167	195	230	356
57115	23/06/80	7.5	.48	54	6	2	6.6	142	15	2	<0.1	0.7	142	157	200	304
57117	23/06/80	7.3	.05	146	23	13	3.3	380	32	38	<0.1	1.5	380	458	560	840
57118	23/06/80	7.1	.15	141	15	11	132	362	55	24	<0.1	36	362	412	800	1140
57120	23/06/80	7.5	.13	120	5	5	1.5	292	19	7	<0.1	0.4	292	321	375	575
57125	24/06/80	7.4	.03	128	6	7	4.1	287	31	8	<0.1	4.6	287	343	450	622
57126	24/06/80	7.6	.03	87	9	5	1.2	160	16	19	<0.1	14	160	253	400	485
57129	24/06/80	7.3	.05	120	11	3	3.7	316	18	2	<0.1	1.0	316	346	390	600
57131	26/06/80	7.7	<.01	118	18	13	1.9	275	45	35	0.1	2.3	275	367	450	683
57136	26/06/80	7.6	.04	126	42	138	3.1	265	158	225	<0.1	3.1	265	490	940	1420
57137	26/06/80	7.3	.50	35	1	23	2.4	83	19	15	<0.1	4.1	83	92	180	275
57140	26/06/80	6.7	.36	24	5	6	5.1	14	21	10	<0.1	13	14	79	145	221
57141	26/06/80	7.1	.02	126	40	6	1.3	356	22	61	<0.1	1.6	356	479	600	818
57142	26/06/80	6.8	.36	19	2	2	2.7	26	12	14	<0.1	1.3	26	57	98	150
57143	26/06/80	6.4	.04	32	4	6	7.0	37	19	6	<0.1	15	37	98	165	256
57145	26/06/80	7.2	.01	116	10	3	2.9	295	13	3	<0.1	4.3	295	332	380	580
57146	26/06/80	7.5	.16	103	14	9	2.4	276	28	13	0.3	0.3	276	314	370	578
57147	26/06/80	7.3	.79	87	10	11	3.1	225	22	27	0.2	0.2	225	257	355	530
57148	26/06/80	8.1	.33	29	1	3	2.4	59	10	3	<0.1	2.8	59	76	110	166
57149	26/06/80	7.5	.04	88	6	8	2.7	144	20	62	<0.1	1.8	144	246	450	515
57151	26/06/80	7.7	.03	76	22	9	2.4	217	37	17	<0.1	2.9	217	280	375	532

Table 2. Inorganic Chemical Analyses - Deep Overburden Wells

(sample locations shown on Map 3126–3)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
443	27/07/59	8.0	0.28	–	–	–	–	–	–	3	–	–	159	151	–	–
805	23/06/80	7.6	0.67	71	6	4	10	188	15	<1	0.1	<0.1	188	201	235	363
1075	24/06/80	8.0	0.24	49	9	3	1.7	147	11	<1	<0.1	0.2	147	159	190	291
1892	25/03/64	8.0	0.13	–	–	–	–	–	19	13	–	0.6	194	250	300	–
3448	18/05/66	–	–	65	17	–	–	268	20	10	0.1	0.15	156	162	–	–
3888	18/07/63	7.9	0.2	–	–	–	–	–	26	8	–	2.0	178	190	–	–
3978	23/06/80	7.7	0.06	76	14	4	2.3	227	17	<1	0.1	1.0	227	246	285	436
4476	18/07/63	7.9	0.25	–	–	–	–	–	16	5	–	–	174	166	–	–
4479	18/07/63	7.5	0.12	–	–	–	–	–	24	9	–	1.5	242	248	–	–
4503	18/07/63	8.2	0.15	–	–	–	–	–	–	10	2	0.10	120	122	–	–
4505	30/06/64	8.1	–	–	–	–	–	–	10	2	0.1	0.15	156	162	–	–
6384	23/06/80	7.6	0.02	65	17	4	2.0	193	16	2	0.1	5.7	193	231	275	420
57101	23/06/80	7.9	0.34	46	15	7	1.7	177	10	<1	0.1	<0.1	177	177	215	328
57103	23/06/80	7.7	0.10	61	12	3	2.6	177	25	1	0.1	0.3	177	203	235	364
57105	23/06/80	7.6	0.33	141	22	25	4.3	332	60	39	0.1	11	332	444	700	868
57107	23/06/80	8.1	0.11	43	4	2	1.2	107	12	<1	<0.1	0.3	107	120	150	228
57110	23/06/80	7.8	0.13	59	15	5	2.3	157	30	10	0.1	4.0	157	211	265	405
57111	23/06/80	7.9	0.07	50	7	3	2.5	118	22	4	<0.1	4.1	118	156	200	308
57112	23/06/80	8.0	0.10	40	7	2	1.5	114	15	<1	<0.1	0.1	114	128	160	244
57114	23/06/80	8.1	0.10	39	4	1	0.8	99	11	<1	<0.1	0.3	99	112	135	210
57116	23/06/80	8.2	0.03	38	3	4	1.6	78	14	2	0.1	5.4	78	110	150	227
57122	24/06/80	7.7	0.07	76	4	2	1.3	185	13	<1	<0.1	1.3	185	207	240	368
57127	24/06/80	7.8	0.21	54	17	10	1.8	181	23	12	0.1	<0.1	181	207	265	405
57128	24/06/80	7.8	0.02	78	8	1	0.8	201	13	2	<0.1	1.4	201	226	255	396
57130	24/06/80	7.8	0.16	61	14	3	1.1	174	19	2	0.1	3.5	174	209	245	378
57150	24/06/80	7.6	0.07	109	6	7	1.6	255	15	10	<0.1	5.4	255	298	370	545
57152	27/06/80	7.6	0.17	<1	<1	185	1.9	300	31	14	<0.1	12	300	3	490	735

Table 3. Inorganic Chemical Analyses - Bedrock Wells

(sample locations shown on Map 3126–5)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
2774	01/71	7.4	0.15	–	–	–	–	–	–	189	–	1.2	248	304	390	–
2818	09/71	7.2	0.10	–	–	–	–	–	–	249	–	4.0	270	440	820	–
3958	18/07/63	7.9	0.18	–	–	–	–	–	635	149	1.6	0.3	236	550	–	–
5366	26/06/80	8.0	0.12	369	29	1090	8.8	51	1950	847	1.7	<0.1	51	1040	4530	5550
13843	27/06/80	7.4	3.0	116	17	6	2.0	276	63	10	<0.1	<0.1	276	358	440	620
57132	26/06/80	7.5	0.24	161	9	5	2.7	246	57	21	<0.1	28	246	440	670	810
57133	26/06/80	7.6	0.40	127	1	4	12.4	234	40	16	<0.1	8.5	234	321	435	610
57134	26/06/80	7.7	0.05	83	12	17	1.5	189	45	23	0.1	3.9	189	257	380	525
57135	26/06/80	7.0	0.04	197	14	23	3.2	359	130	43	<0.1	6.2	359	550	625	1005
57139	26/06/80	7.2	0.06	134	11	13	25	296	78	27	0.2	1.7	296	378	525	763
57144	26/06/80	6.5	0.60	31	6	5	1.9	48	14	31	<0.1	1.7	48	101	155	240

DESCRIPTIVE NOTES

The inorganic chemical quality of ground water at locations in the study area can be estimated by inspecting the analyses of nearby ground-water samples. Analyses of the samples are shown in tables 1, 2 and 3; locations of the samples are shown on maps 3126-1, 3126-3 and 3126-5. Samples were taken from selected overburden and bedrock wells and indicate quality of ground water in the common water-bearing zones in different parts of the study area.

The following table summarizes water-quality criteria from the publication: "Water Management—Goals, Policies, Objectives, and Implementation Procedures of the Ministry of the Environment, 1978". These criteria are maximum concentrations recommended for drinking water supplies and for agricultural uses. While the criteria should generally be adhered to, slight excesses are usually not harmful. In cases where quality of the water supply is in doubt, local health authorities should be consulted.

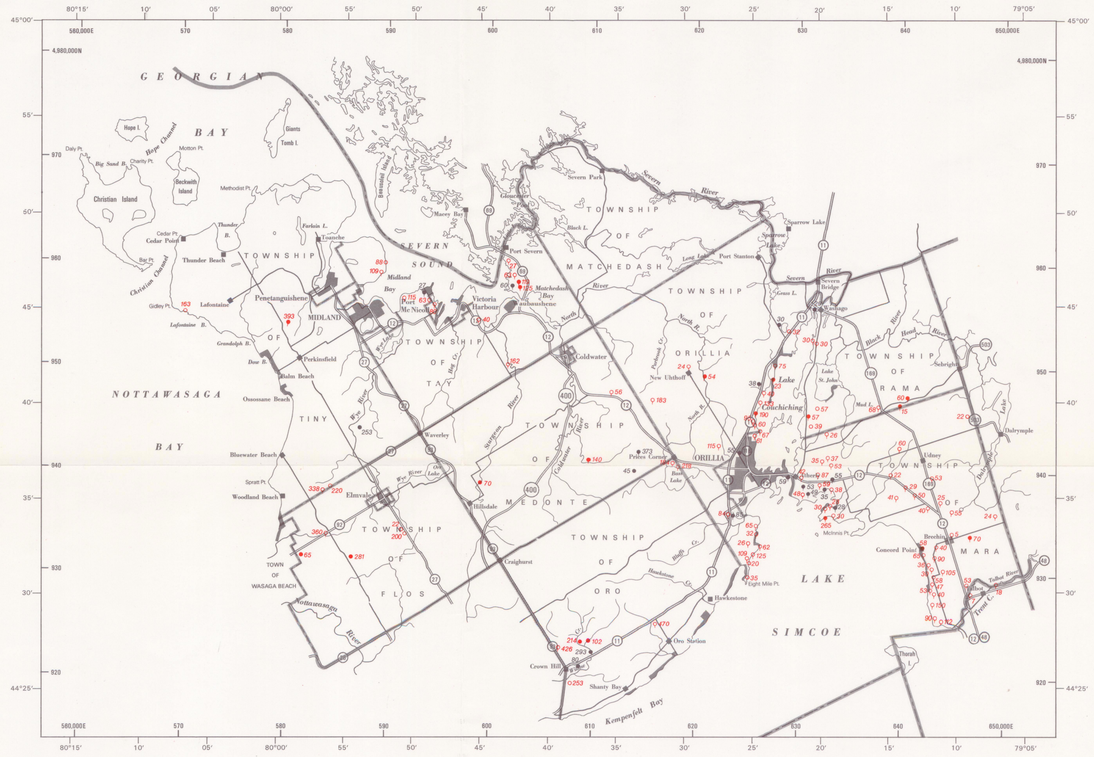
WATER QUALITY-SUMMARY

Of the wells sampled in the northern portion of the County of Simcoe, 2 per cent have salty water (chloride content over 250 mg/L), 19 per cent have high concentration of nitrates (NO_2+NO_3 over 10 mg/L), 23 per cent have high concentrations of iron (over 0.3 mg/L), and 19 per cent have very hard water (over 400 mg/L $CaCO_3$). Of those wells with high concentrations of nitrate, 70 per cent were in shallow overburden and probably suffer contamination from surface-water runoff. Most sulphurous, salty and mineralized water wells are those drilled into bedrock as in the eastern portion of the map area around Orillia and Lakes Simcoe and Couchiching. A few overburden wells more than 200 feet deep also yield poor quality water as in the south-central (northeast of Barrie) and southwestern (Flos and Tiny townships) portions of the map area.

Table 4. Water Quality Parameters

Substance	Significance	Drinking Water Quality Criteria	Agricultural Water Quality Criteria
Iron	Iron in excessive concentrations will precipitate after exposure to air, which causes turbidity, stains plumbing fixtures, laundry and cooking utensils, and imparts objectionable tastes and colours to foods and drinks.	0.3 mg/L*	not specified
Hardness (Calcium, Magnesium)	Consumes soap before a lather will form. Hard water forms scale in water heaters and pipes. Waters of hardness greater than 180 mg/L are classified as very hard.	not specified	not specified
Sodium Potassium	Large amounts in combination with chloride give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. A high sodium content may limit the use of water for irrigation and in some instances for domestic consumptive uses.	not specified	not specified
Sulphate	In large amounts, sulphate can have laxative effects on unaccustomed users and in combination with other ions, gives a bitter taste to water.	250 mg/L	not specified
Chloride	In large amounts and in combination with sodium, chloride gives water a salty taste and increases the corrosiveness of water.	250 mg/L	not specified
Fluoride	In large amounts, fluoride can disfigure teeth by mottling the enamel. However, in more desirable amounts (1.0 mg/L), fluoride has been found to inhibit tooth decay.	2.4 mg/L	2.0 mg/L
Nitrate	Concentration much greater than the natural regional background may suggest pollution. Waters of high nitrate content cause methemoglobinemia (an often fatal infant disease) and therefore should not be used in infant feeding. Nitrate encourages the growth of algae and other organisms that produce undesirable tastes and odours.	10 mg/L (as N)	100 mg/L**
Dissolved Solids	High dissolved solids may often suggest that criteria of one or more substances have been exceeded.	500 mg/L	3000 mg/L

*mg/L = milligrams of substance per litre of water
**nitrate + nitrite



Map 3126–8

WATER QUALITY

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

5 0 5 10 Miles

5 0 5 10 15 Kilometres

LEGEND

- ● 214 — Overburden well with reported salty water; depth to salty water-bearing zone shown in feet
- ○ 163 — Overburden well with reported sulphurous water; depth to sulphurous water-bearing zone shown in feet
- ● 253 — Overburden well with reported mineralized water; depth to mineralized water-bearing zone shown in feet
- ● 393 — Bedrock well with reported salty water; depth to salty water-bearing zone shown in feet
- ○ 338 — Bedrock well with reported sulphurous water; depth to sulphurous water-bearing zone shown in feet
- ● 373 — Bedrock well with reported mineralized water; depth to mineralized water-bearing zone shown in feet

NOTE:
"Sulphurous" water usually denotes the presence of hydrogen sulphide gas; a high concentration of sulphate (SO_4) may also be present

SOURCES OF INFORMATION

Map compilation by M. E. Turner

Cartography by D. McQuillan

Geologic information was derived from water-well records on file with the Ontario Ministry of the Environment up to September, 1979

Base map was derived from 1:25 000 and 1:50 000 sheets of the National Topographic series

METRIC CONVERSIONS

1 foot	=	0.305 metres
1 mile	=	1.609 kilometres
1 gallon	=	4.546 litres
1 gallon per minute	=	7.576×10^{-2} litres per second

MOE 2242

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE (Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 4

GROUND-WATER QUALITY